

USPTO Customer No. 25280
Serial No: 10/679,239

Inventor(s): Mannion et al
Case No: 5647

REMARKS

The Applicants thank the Examiner for the thoughtful comments in the most recent Office Action.

Claims 1-13 were rejected. Claims 1-13 have been amended. New claims 14-19 have been added.

These new claims are fully supported by the originally filed specification. The examiner is referenced to pages 10, 19, 26, and page 30, Table 4, for such support.

Terminal Disclaimer

Applicants enclose with this Amendment a terminal disclaimer to dispose of the obviousness type double patenting rejection over pending application number 10/679,217.

Claim Objections

Objectional terms have been removed from claims 1 and 2, as suggested in the Office Action. The amended claims are clear and definite, as required. Claims 3 and 4 are corrected as well, and avoid the inappropriate use of Group I/II language. Claim 6 now avoids the use of "any", as suggested.

Section 112

Claim 1 and claim 2 have been clarified, and made consistent with the specification. The subject matter refers to "thermoplastic formulation", as specifically recited throughout the specification: See page 1, line 2; page 6, line 8 and line 12; page 10, first paragraph; page 11, first paragraph; and other places in the specification as well.

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References to "thermoplastic article" have been removed, as suggested by the Office Action.

Section 103

The obviousness rejection is traversed. The amended claims are not obvious over Zhao (United States Patent No. 6,465,551) in view of Duffy (US Patent No. 4,417,999), in part for reasons set forth below.

The Invention

The invention is a novel and nonobvious improvement to known thermoplastic formulations, by use of additives. One aspect of this improvement is adapted to assist in solving a real world problem.

Nucleating agents are used in various polymers, to reduce haze (increase clarity) and to increase the crystallization temperature of polymers. Thus, the performance of nucleating agent compositions is often measured as better haze and a more favorable crystallization temperature. Nucleating agents are provided in particulate form, and blended into polymers in large scale manufacturing processes. There is a constant endeavor in the industry to improve haze and crystallization temperature characteristics of nucleating agents.

One way to improve such characteristics is to increase dispersion. Increasing dispersion may be accomplished with small size particles. However, small size nucleating agents suffer from agglomeration due in part to water absorption while in storage. This agglomeration makes it essentially impossible in many cases to feed such powders in the manufacture of thermoplastic compositions. Feeding problems are serious manufacturing limitations, that slow or halt production.

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When using small size compounds, there is a tendency for the compounds to suffer from stacking and eventual agglomeration (which inevitably leads to cementation of the stored solid compounds), thus deleteriously affecting the ability to actually disperse, if not use altogether, such compounds in thermoplastic media. Additionally, during storage such compounds exhibit "growth" due to such agglomeration as well within the packaging container such that it has been noticed on regular occasions that the storage container itself becomes ruptured and/or damaged and the nucleator powders leak --- or it becomes very difficult to remove the cemented product therefrom.

The invention relates to the use of such small size nucleating agents in combination with anticaking agents, which may optionally be milled together.

Furthermore, it has surprisingly been discovered that relatively large ratios of anticaking agent to nucleating agent provide unexpected results, without decreased performance, but instead with increased performance.

The Prior Art

Zhao discloses nucleating agents. In Zhao, the agents are milled. See column 7; line 50; column 7, line 67.

However, there are no disclosures in Zhao of the use of anticaking agents, as defined in the amended claims. The Zhao disclosure does not solve agglomeration problems using anticaking agents.

Zhao does not disclose the ratios recited in the claims. There is not even a *prima facie* case of obviousness based upon the teachings of Zhao. The elements of claim 1 and 2, and all the claims depending from claim 1 and 2, are not met by Zhao. The teachings of Zhao do not set forth, or even suggest, the limitations in these claims.

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Thus, Zhao does not teach the elements of the invention.

Duffy teaches use of silica gels for imparting antistatic properties to polymers.

The silica gels of Duffy, when used in polymers, are said to avoid sparks, electrostatic charging, and fire hazards.

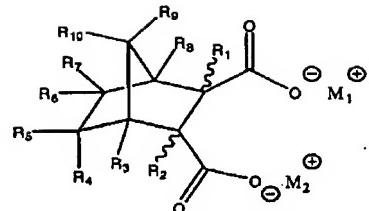
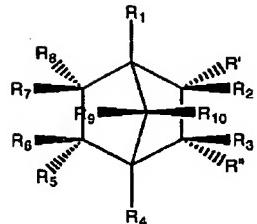
Duffy does not disclose nucleating agents at all. Duffy teaches the use of silica gel as a diluent -- to take up space in a polymer composition. By taking such space, sparks and electrostatic discharges are minimized. The silica gels in Duffy are not stated to improve performance efficacy of the polymer. Thus, the silica gels in Duffy are essentially benign fillers, which dilute the efficacy of the polymer for chemical reactivity and the like, but which provides certain electrical benefits.

In Duffy, a person of skill in the art would recognize that since the silica gel does not contribute to usefulness or efficacy (and dilutes the chemical efficacy), one would be motivated to use as little as possible of the silica gel. One would be motivated to use the absolute minimum of such silica gels that are needed to serve the purpose of avoiding electrostatic charges. In general, increasing the concentration of an inactive component beyond known usage levels is simply not useful, is more costly, dilutes the efficacy of the polymer, and provides a greater risk that the product may have unintended problems due to a greater amount of benign agent in the mix.

Duffy does not teach the use of silica gels with nucleating agents. In particular, Duffy does not teach the use of silica gels with nucleating agents having the structures below:

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Without these teachings, there cannot even be a *prima facie* case of obviousness. Duffy does not remedy the deficiencies in the Zhao disclosure, and thus the elements of the invention are not satisfied by Zhao, by Duffy, or by any combination of Duffy and Zhao.

There is no teaching or motivation evident in the prior art that would counsel in favor of modifying the compositions of Zhao, or Duffy, to apply the specific claimed features set forth in claims 1 and 2, and the dependent claims which also contain these limitations.

Importantly, Duffy teaches the use of about 5-10% silica. Duffy states he prefers 7-8% silica, to solve electrostatic discharging problems in his polymers. See column , lines 1-15.

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A person of skill in the art would be motivated, by the teachings of Duffy, to use only the amount needed to avoid electrical sparks, which is a maximum of 10%. Since the silica as described by Duffy has no apparent efficacy for chemical purposes, there would be no incentive (and in fact would be a significant disincentive) to using greater than 10% silica to solve the electrostatic discharge problem. Duffy teaches away from any concentration greater than 10%, and advocates 7=8% as ideal.

On the other hand, the claims above recite a small size nucleating compound (which is completely absent from Duffy) intimately associated with an anticaking agent, said anticaking agent being provided in a weight ratio of anticaking agent to nucleating compound of from about 10:90 to about 30:70.

There is no teaching or suggestion in Zhao, or Duffy, taken along or together, that predicts or even suggests the invention of this application.

The invention has surprisingly beneficial features, and significantly greater ratios of silica, that are not recognized in the prior art. In the invention, the silica is not a benign "filler", but surprisingly, the intimate mix of anticaking agent and nucleating agent, when applied in a thermoplastic -- shows performance enhancements ---- not a loss or a dilution of efficacy. The data in the application supports this, and the Examiner is directed to pages 24-31, including the data reported in Table 4.

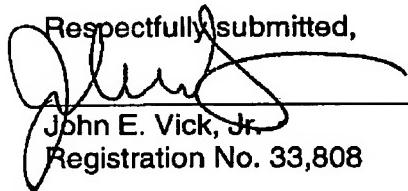
It is believed that the above claims patentably define over the prior art record and that the application is in complete condition for allowance. Should any issues remain after consideration of this Amendment, however, the Examiner is invited and encouraged to telephone the undersigned at his convenience.

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Fee Authorization: In the event that there are additional fees associated with the submission of these papers, Applicant hereby authorizes the Commissioner to withdraw those fees from our Deposit Account No. 04-0500.

Extension of Time: In the event that additional time is required to have the papers submitted herewith for the above referenced application to be considered timely, Applicant hereby petitions for any additional time required to make these papers timely and authorization is hereby granted to withdraw any additional fees necessary for this additional time from our Deposit Account No. 04-0500.

Respectfully submitted,

John E. Vick, Jr.
Registration No. 33,808

MILLIKEN AND COMPANY
920 Milliken Road, M-495
Spartanburg, SC 29303
Telephone (864) 503-1383
Facsimile (864) 503-1999